

1. Introduction

This document illustrates how to setup the ADA demo on the DE10-Standard and the THDB-ADA as shown in **Figure 1**. The basic design content is also included. In this demonstration, please refer to the DE10-Standard user manual. For details about the THDB-ADA, please refer to the user manual of High-Speed A/D and D/A Development kit.

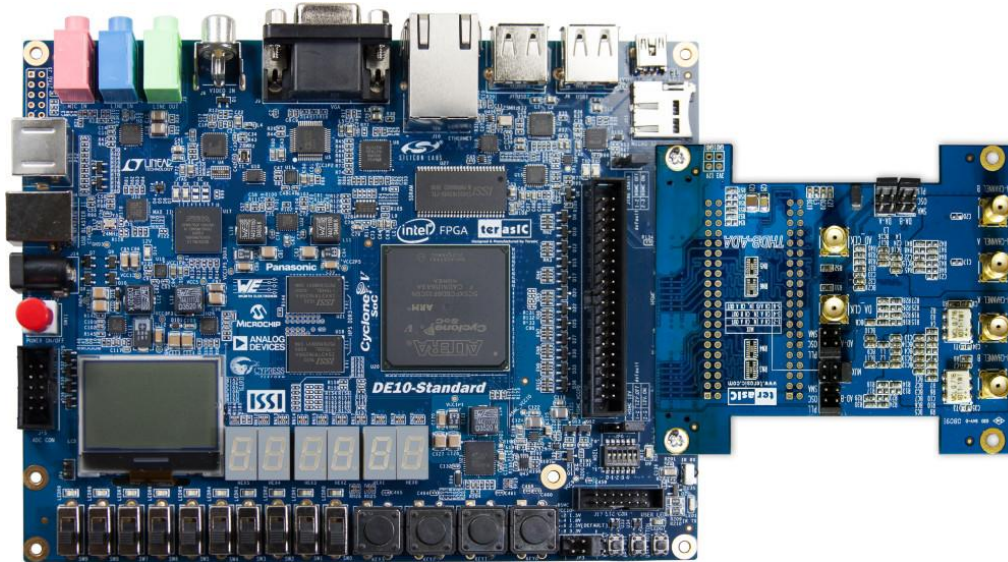


Figure 1 ADA Demo

2. System Requirements

The following items are required to perform this demonstration:

- DE10-Standard and power supply
- THDB-ADA (High-Speed A/D and D/A) daughter card

3. Execute Demonstration

■ Please follow the procedures below to setup the demonstration:

1. Make sure both Quartus II and USB-Blaster II driver are installed on the host PC.
2. Connect a mini-USB cable to an UB2 port of the DE10-Standard and the host PC.
3. Connect the THDB-ADA Daughter Board onto the HSMC port(JP2) expansion header of the DE10-Standard.
4. Use a SMA cable to connect DA-Channel B(J4) with AD-Channel B(J1) or DA-Channel A(J3) with AD-Channel A(J2) depending on which channel you are operating on.

5. Add appropriate jumpers for the mode and the clocks.
 - a. For DAC B clock, add a jumper to JP5 with pins labeled PLL.
 - b. For ADC B clock, add a jumper to JP2 with pins labeled PLL.
 - c. For the selection of MUX option, add a jumper to JP3, between pins 1 and 2.
6. Power on the DE10-Standard Board.
7. Open stp1.stp from <path>\Demonstrations\DE10_Standard_ADA, as shown in **Figure 1**.

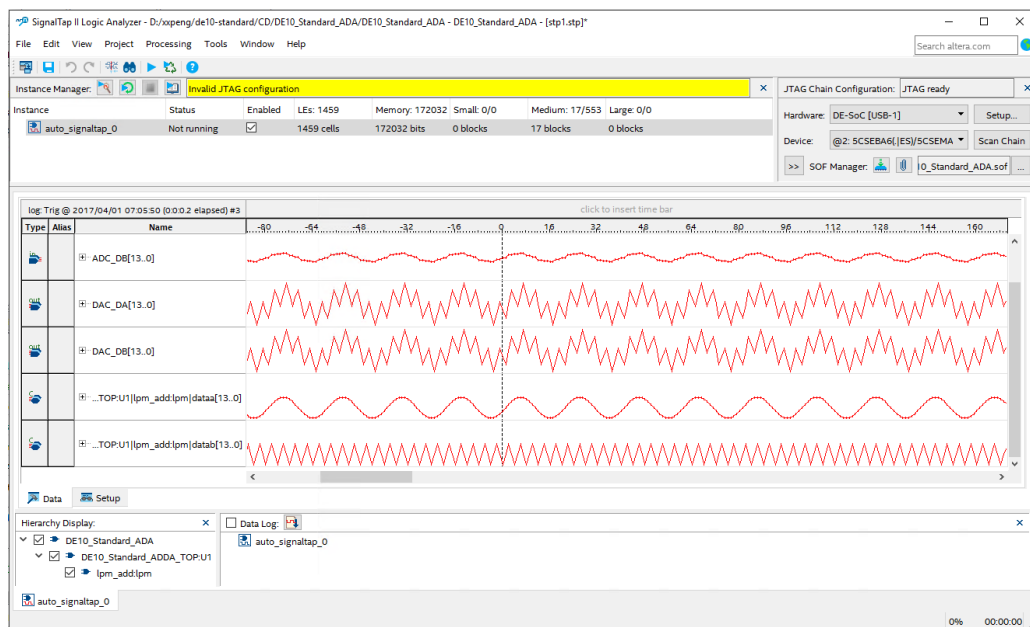


Figure 2 stp1.stp displayed in the SignalTap II Logic Analyzer

■ Collecting Data using the Signal Tap II Logic Analyzer:

1. Click “Program Device” after Hardware and Device are detected correctly.
2. Click “Run Analysis” and observe signals **ADC_DB** and **comb**, which shows attenuated and original combinations of two sine waves, respectively.
3. Click **ADC_DB** and right click to select "**Create SignalTap II List File**" to generate the file stp1_auto_signaltap_0.txt in the project directory. As shown in the **Figure 1**.

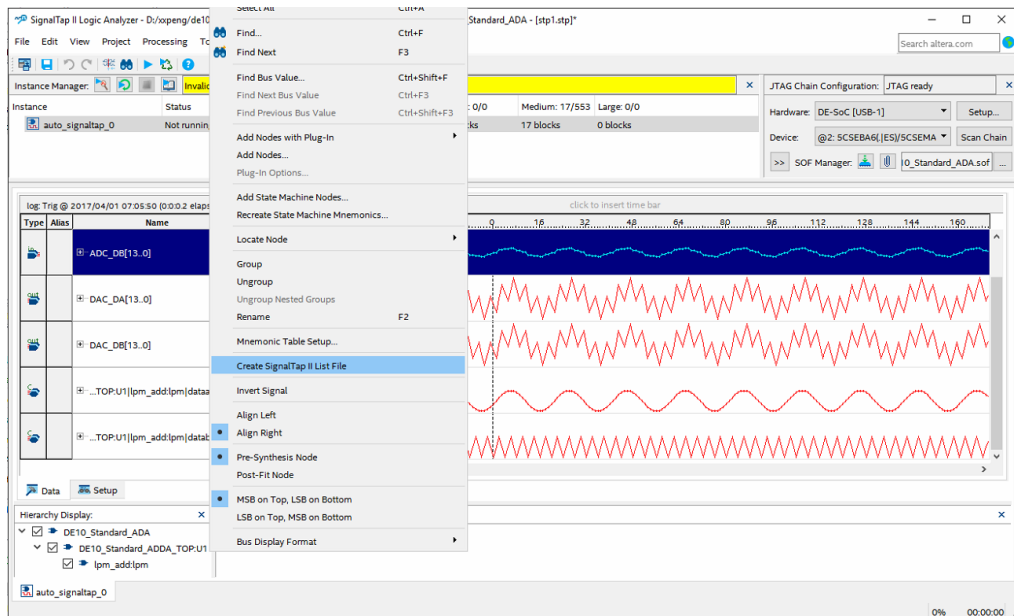


Figure 2 generate the outputfile in the SignalTap II Logic Analyzer

■ Analyzing the Data in the MATLAB Software

1. Click “Program Device” after Hardware and Device are detected correctly.
2. Make sure the current directory is set to <path>\Demonstrations\DE10_Standard_ADA
3. Type `nstp_plot('stp1_auto_signaltap_0.txt')` at the MATLAB command prompt. The MATLAB will display normalized FFT plots of **DAC_B** input and **ADC_B** output similar to **Figure 1** and **Figure 1**, respective

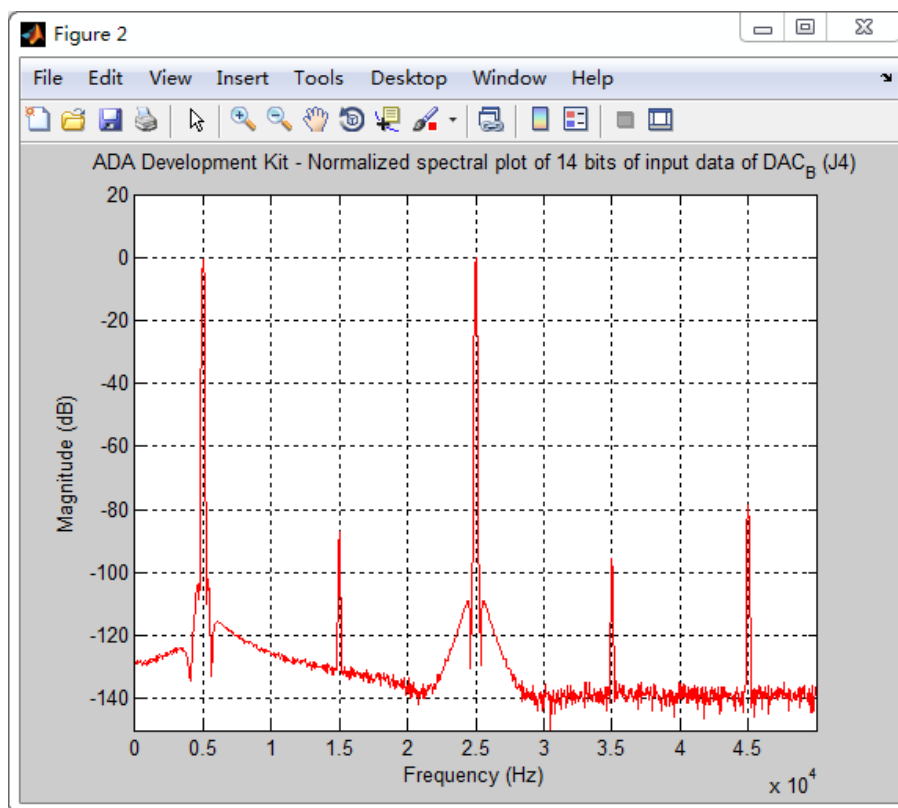


Figure 4 Normalized Spectral Plot of The 14-bit DAC B Input Data

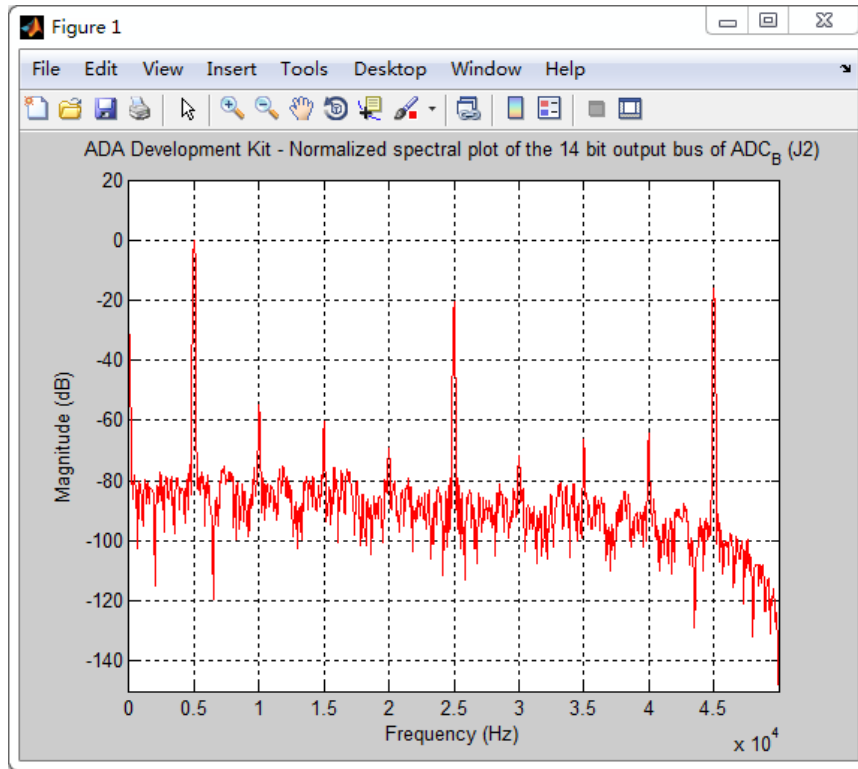


Figure 5 Normalized Spectral Plot of The 14-bit ADC B Output Data